

REMARKS

Pending in the application are claims 1-10, of which claims 1 and 6 are independent. Claims 1-3 and 6-9 have been amended. Claim 10 has been added. The following comments address all stated grounds for rejection and place the presently pending claims, as identified above, in condition for allowance.

Claim Amendment

Claim 1 has been amended to change “attenuation lines” to --grooves formed between the pellets--. Claims 2 and 3 have been amended to clarify that the cooling bodies rotate from an initial arrangement to second and third arrangements subsequently. Claims 6-9, device claims, have been amended to remove the dependency on claim 1, a method claim. Claim 10 has been added to incorporate a limitation deleted from claim 3. No new matter has been added.

Specification Objections – Under 35 U.S.C. §112

The specification is objected to under 35 U.S.C. §112, first paragraph in that it is written in non-idiomatic expressions that render the meaning vague and indefinite. In response to the objection, Applicants have amended the specification to clarify the meaning of the expressions. In particular, Applicants have changed “attenuation lines” to --grooves--, which indicate any indented surface feature, such as grooves or recesses. Applicant therefore request that the 35 U.S.C. 112 objection be withdrawn.

Claim Rejections – Under 35 U.S.C. §112

Claims 1-9 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. In response to the rejection, Applicants

have amended claims 1-3, and 6-9 and added claim 10 to overcome the 35 U.S.C. §112 rejections. In light of the amendment, Applicants respectfully submit that the pending application is in condition for allowance.

Art Rejections – Claims 1-9

Claims 1-9 are rejected under 35 U.S.C. §103(a) as being unpatentable over either German Patent No. 1,508,800 of Blum et al. (the ‘800 patent) or International Publication No. WO 91/12910 of Hugens (‘910 publication) in view of U.S. Patent No. 4,961,461 of Klier et al. (the ‘461 patent). Claims 1-3 and 6-9 have been amended and new claim 10 has been added. Applicants respectfully submit that pending claims 1-10 are not obvious in view of the combination of either the ‘800 patent or ‘910 publication and the ‘461 patent.

The Claimed Invention

Independent claim 1 is directed to a method for producing light-metal pellets. Molten light metal is fed into a gap between two cooling bodies and *divided into pellets of specified size along grooves formed between the pellets* or completely separated before the pellets solidify. *Fibers, particles or similar additives are added* to the molten light metal before the molten light metal enters the gap between two cooling bodies. Independent claim 6 is a device claim that incorporates all of the limitations of claim 1. Claim 6 adds a limitation that the cooling bodies comprise depressions on opposing faces such that the molten light metal between the two cooling bodies is formed into pellets of the shape determined by the depressions.

The ‘800 Patent

The ‘800 patent teaches an apparatus for continuously casting refractory materials into an ingot. The ‘800 patent relates to very high-melting-point materials such as uranium carbide. The granular refractory materials are introduced into a crucible (12) and melted by an electron gun (1) disposed above the crucible. The side wall of the crucible

(12) is cooled off for forming into casting skin the portion of the molten refractory material in contact therewith. The side wall of the crucible (12) is continuously replaced by an identical wall.

Applicants respectfully submit that the '800 patent fails to teach or suggest that *fibers, particles or similar additives are added before the molten light metal enters the gap between multiple cooling bodies*. The '800 patent teaches continuous melting and casting of refractory material. In the '800 patent, a conduit (2) is provided to deliver particles of materials to be melted into the stream of electrons emitted from a electron gun (1) disposed above a crucible (12). The cooled wall of the crucible is continually renewed as the ingot is cast. The '800 patent does not teach or suggest that additives are added to the molten material.

The '910 Publication

The '910 publication teaches a method for producing discrete molded shapes. A continuous stream of molten material is supplied to a mold. Forming means (27), such as dividers and spacers, are employed on the upper belt (14) and inserted into the mold at desired intervals so as to divide the molten metal (11) into discrete segments. The forming means (27) are retained in the molten material (11) during its transition to a solid so as to substantially solidify the molten material.

Applicants respectfully submit that the '910 publication also fails to teach or suggest that *fibers, particles or similar additives are added before the molten light metal enters the gap between multiple cooling bodies*. The '910 publication teaches the casting of discrete solid shape from a molten material. The 910 publication teaches using a mold casting machine where the shapes are formed between spaced portions of a pair of endless flexible casting belts which move along with opposite surface of the metal being cast. The '910 publication does not teach or suggest that additives are added to the molten material (11).

The '461 patent

The '461 patent teaches the continuous *manufacturing of a composite* in which dispersates are mixed within a matrix material. Molten metal alloy (100) and concentrated dispersion (101) containing a particulate ceramic dispersate in a precursor dispersion material are continuously fed into a chamber (102). The mixture is first blended, then agitated to shear both the particulate and matrix. Well dispersed slurry is then fed into a crucible for solidification processing, or is continuously cast into a billet.

Applicants respectfully submit that the '461 patent fails to teach or suggest that the molten light metal are fed into a gap between two cooling bodies and divided into pellets of specified size along grooves. The '461 patent teaches the continuous manufacture of a composite in which dispersates are mixed within a matrix material. The '461 patent only teaches that the dispersed slurry is then fed into a crucible for solidification processing, or is continuously cast into a billet. The '461 patent does not teach that the dispersed slurry is fed into a gap between two cooling bodies and divided into pellets of specified size along grooves.

Furthermore, the '461 patent fails to teach that *fibers, particles or similar additives are added before the molten light metal enters the gap between the cooling bodies*. The '461 patent teaches that molten metal alloy and concentrated dispersion containing a particulate ceramic dispersate are mixed. The '461 patent also teaches the manufacture of composite of silicon carbide dispersed in a aluminum or magnesium alloy. The '461 patent, however, does not teach that fiber or the similar additives are added to the molten material before the molten material enters the gap between the cooling bodies.

References Fail To Teach All Of The Limitations Of The Claimed Invention

Based on the distinctions set forth above, Applicants submit that the cited references fail to teach or suggest all of the claim limitations of the claimed invention. Neither of the '800 patent nor the '910 publication fails to teach that additives are

additives added before the molten light metal enters the gap between the cooling bodies. The '416 patent also fail to teach that fiber or the similar additives are added before the molten light metal enters the gap between the cooling bodies. Accordingly none of the references teach or suggest that *fiber, particles or the similar additives are added before the molten light metal enters the gap between the cooling bodies.*

The Combination Does Not Construct The Claimed Invention

Applicants respectfully submit that the combination of the references does not construct the claimed invention. As set forth above, the references fail to teach or suggest that fiber, particles or similar additives are added to the molten material before the molten light metal enters the gap between the cooling bodies. If the teachings of the cited references are combined, concentrated dispersion or silicon carbide is added to molten metal material to produce pellets. The combination does not result in the claimed invention in which *fibers are added in the production of the pellets.*

No Motivation To Combine References to Construct The Claimed Invention

Applicants respectfully submit that there is no suggestion or motivation, either in the teachings presented within the cited references or the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine the reference teachings.

The claimed invention is directed to the production of light-metal *pellets, not a final work piece.* The claimed invention recites that fibers, particles or similar additives are added in the production of the pellets. Additives are added to strengthen the cast material of the final work piece produced by melting the pellets. The additives are added in the production of the pellets to distribute the additives more regularly when melting the pellets and casting the final work piece.

The '461 patent teaches a composite in which dispersates are mixed within a matrix material. Assuming that fibers are added to the matrix material that is cast into

pellets, there may be a problem in the process of separating the pellets because fibers may be located across two or more pellets, which ties the pellets together and makes the separation difficult. If fibers are added to the matrix material that is cast into a form of a final work piece, there is no problem with the separation of the pellets. But this is not the claimed invention. Moreover, the Examiner's proposed combination would not appear to operate in the claimed invention.

The claimed invention is directed to the production of pellets in which fibers are added. If the material is molten twice, first in the production of pellets and then in the melting of the pellets to cast a final product, it can be disadvantageous to add the fibers in the production of pellets because it makes it difficult to break up pellets. Thus, one of ordinary skill in the art would not have been motivated to add fibers in the production of the pellets.

In light of the argument set forth above, Applicants submit that claims 1 and 6 are not obvious in view of the combination of either the '800 patent or '910 publication and the '461 patent. Claims 2-5 and 7-10, which depend on one of claims 1 and 6, are not rendered obvious over the cited prior art. Applicants therefore request the withdrawal of the Examiner's rejection of claims 1-10 as being unpatentable over the cited prior art.

Conclusion

For the foregoing reasons, Applicants contend that claims 1-10 distinguish patentably over the prior art. As such, the Applicants respectfully request that the Examiner's rejections based upon 35 U.S.C. §112 and 35 U.S.C. §103 be reconsidered and withdrawn.

If there are any remaining issues, an opportunity for an interview is requested prior to the issuance of another Office Action. If the above amendments are not deemed to place this case in condition for allowance, the Examiner is urged to call the Applicants' representative at the telephone number listed below.

Respectfully submitted,
LAHIVE & COCKFIELD, LLP



David R. Burns
Reg. No. 46,590
Attorney for Applicants
28 State Street
Boston, MA 02109
(617) 227-7400

Date: January 30, 2003

Version With Markings to Show Changes Made

In the Specification

Page 2, line 19, please replace the paragraph with the following:

-- ~~Separation into separate individual~~ Individual pellets may be disconnected both by location and time from the production of such bodies, e.g., in a special reduction unit placed upstream from the processing machine, or reduction may be performed by feeding the sheet or strip into the processing machine where these are broken up into individual pellets by a screw conveyor provided in the machine. ~~this~~ This process ~~being~~ is facilitated by ~~attenuation lines~~ grooves formed between the pellets.--

Page 2, line 26, please replace the paragraph with the following:

--The molten light metal is passed through a narrow gap between two cooling bodies ~~which form a narrow gap~~ in which the cooling effect is especially intensive, a function of depending on the quantity of molten metal adjacent to the cooling bodies, and in which the light metal may be stamped or cut. Solidification may proceed here at least at the surface of the material to the extent of generating an enclosed skin and thus providing shape.--

Page 3, line 8, please replace the paragraph with the following:

--It is advantageous to have the cooling bodies be synchronously ~~movable~~ rotatable such that the light metal is not simply fed through subject to the friction of the cooling bodies but the cooling bodies ~~simultaneously form~~ include a transport device for the light metal. By employing a rounded or beveled shape or arrangement for the cooling bodies, a receiving chamber is created for the molten light metal, and this chamber subsequently ~~leading~~ leads to the afore-mentioned gap. The shaping of the liquid or partially solidified light molten light metal, or the complete separation of light metal either partially or completely solidified, may take place in this gap.--

Page 4, line 19, please replace the paragraph with the following:

--Fig. 1 shows two roller-shaped cooling bodies 1 where funnel 2 is provided ~~for~~ above and between both cooling bodies 1 to feed molten light metal 3 which is designated hereafter as molten magnesium simply as an example. The two cooling bodies 1 are driven counter-rotationally and synchronously relative to ~~one another~~ each other, and may be cooled by a cooling unit not shown. The magnesium solidifies at the surface of cooling bodies 1, and when molten magnesium 3 enters gap 4, ~~created as a narrowing~~ between both cooling bodies 1, a narrow magnesium strip 5 is produced which has solidified sufficiently at least at its outer surface to allow it then to be drawn from the device.--

Page 4, line 29, please replace the paragraph with the following:

--Shown schematically on magnesium strip 5 are ~~attenuation lines~~ grooves 6 which have been stamped into magnesium strip 5. These ~~attenuation lines~~ grooves 6 are generated by ridges 7 shown schematically which are provided on the surfaces of cooling bodies 1.--

Page 4, line 33, please replace the paragraph with the following:

--For the sake of simplifying the drawing, no concavities or projections are visible on the edge of magnesium strip 5 and cooling bodies 1; and additionally, ~~attenuation lines~~ grooves 6 and ridges 7 are drawn as straight and continuous, thus producing rectangular pellets. Other pellet forms of differing shape are possible and may be chosen specifically as appropriate to the alloy composition of the molten metal selected and the intended application of the pellets.—

Page 5, line 4, please replace the paragraph with the following:

~~Attenuation lines~~ Grooves 6 establish defined fracture lines of magnesium strip 5 so that magnesium strip 5 may be processed, using little energy, to create pellets 8 in a downstream crushing or deformation device not shown. Magnesium strip 5 simply

represents a connected arrangement of these pellets 8 before these pellets 8 are subsequently broken up.--

Page 6, line 8, please replace the paragraph with the following:

--As explained above, the surface design of cooling bodies 1 in the embodiment of Fig. 2 may be created with projecting ridges 7 or molded depressions, as indicated schematically, and in this embodiment of a device according to the invention as well, the final separation of the individual pellets may be achieved in the device itself or subsequently in a specially provided crusher along the appropriate attenuation lines grooves 6 which are indicated schematically.--

In the Claims

Please amend claims 1-3 and 6-9 as follows:

1. (Amended) A method for producing light-metal pellets, comprising feeding molten light metal into a gap between two cooling bodies, dividing the molten light metal into pellets of specified size along attenuation lines grooves formed between the pellets or by completely separating them the pellets before the pellets solidify, and adding fibers, particles or similar additives before the molten light metal enters the gap.
2. (Amended) The method according to claim 1, comprising synchronously moving rotating the cooling bodies from an initial arrangement in which surfaces of the cooling bodies are spaced a certain distance from each other, into a second arrangement in which the surfaces move are spaced close together to form the gap, and subsequently move back rotating into the a third spaced arrangement.
3. (Amended) The method according to claim 2, wherein in the step of moving, the motion rotation from the initial to the third arrangement of the cooling bodies occurs

from top to bottom, ~~further comprising the step of feeding the molten light metal into a funnel formed between the cooling bodies.~~

6. (Amended) A device for ~~implementing the method according to claim 1~~ producing light-metal pellets, comprising:

means for feeding molten light metal into a gap between two cooling bodies;
means for dividing the molten light metal into pellets of specified size along
grooves or by completely separating them before the pellets solidify; and
means for adding fibers, particles or similar additives before the molten light
metal enters the gap, wherein the cooling bodies comprise depressions on opposing faces
such that the molten light metal between the two cooling bodies is formed into pellets of
the shape determined by the depressions.

7. (Amended) ~~A The device for working the method according to claim 4~~ 6, wherein the cooling bodies have the form of conveyor belts with two reversing points each, and a cooling zone provided between them along which the two cooling bodies form the gap or are disposed in contact with one another.

8. (Amended) ~~Utilization of a The device according to claim 6, comprising~~ wherein the ~~two~~ cooling bodies ~~having~~ have ridges projecting from opposing faces, such that the molten light metal between the two cooling bodies are formed into pellets, which are separated by the ridges, ~~to work the method according to claim 1.~~

9. (Amended) ~~Utilization of a The device according to claim 6, comprising~~ wherein the ~~two~~ cooling bodies are designed as two wheels or rollers which are arranged adjacent to or in contact with one another so as to form a gap between circumferential edges, ~~to work the method according to claim 1.~~

Please add claim 10 as follows:

10. (New) The method according to claim 2, further comprising the step of feeding the molten light metal into a funnel formed between the cooling bodies.